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09/912,166	07/24/2001	Jorg Lahann	MIT9151	3967

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EXAMINER

CHACKO DAVIS, DABORAH

ART UNIT

PAPER NUMBER

1756

DATE MAILED: 06/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n No.

09/912,166

Applicant(s)

LAHANN ET AL.

Examin r

Daborah Chacko-Davis

Art Unit

1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 July 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6, 7, 9, 13, 14, 21-30 and 32 is/are rejected.
- 7) ☒ Claim(s) 5, 8, 10-12, 15-20, and 31 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2, at lines 1-2, recites "said process includes coating a substrate with a reactive coating that includes repeating units selected from the following: pages 36-40 (repeating units 1-24)", and renders the claim indefinite, and is an improper Markoosh group. It is not clear if the coating material includes all the 24 recited repeating units or if the repeating unit is one among them. Claim 2 should be amended to recite "repeating units selected from a group consisting of 1, 2, 3, 22, 23, and 24".

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 1, 3, 6-7, 13-14, 21, 24-28, and 32, are rejected under 35 U.S.C. 102(b) as being anticipated by U. S. Patent No. 5,869,135 (Vaeth et al).

Vaeth, in the abstract, in col 3, lines 53-65, in col 4, lines 1-15, and lines 23-46,

Art Unit: 1756

discloses a chemical vapor deposition wherein the coating (polymeric) has sufficient intrinsic reactivity (the monomer is sublimated to reactive monomer vapor) to react with target molecules (carrier gas molecules) (claim 1). Vaeth, in col 4, lines 23-46, discloses that the interfaces (coatings) are based on co-polymers (condensation polymerization occurs at the substrate surface) (claim 3). Vaeth, in col 4, lines 10-11, lines 23-46, and in col 5, lines 29-61, discloses that the polymeric coating contains functional groups (monomer in the bath) that react with functional groups (monomer vapor in the carrier gas) in the presence of electromagnetic radiation resulting in stable linkages (the monomers polymerize to form polymers) (claims 6-7). Vaeth, in col 5, lines 30-52, discloses that the polymeric coating is applied in the form of a pattern on the substrate (claim 13). Vaeth, in col 4, lines 4-7, in col 5, lines 18-20, discloses that the monolayer is microstructured by stamping the monolayer deposited on the substrate to form a pattern (claim 14). Vaeth, in col 3, lines 53-65, and in col 4, lines 13-15, discloses that the patterning of the polymeric layer is performed using layer-by-layer adsorption (different regions of the substrate adsorb differently) (claim 21). Vaeth, in col 4, lines 9-12, discloses that the substrate is selectively exposed to plasma prior to the deposition process (claim 24). Vaeth, in col 4, lines 10-15, and lines 35-46, and in col 5, lines 40-53, discloses that the chemical groups (monomers and precursors) of the coating to be formed have intrinsic reactivity to react with the carrier gas molecules and the coating formed on the substrate is distributed anisotropically (pattern formed on the substrate) (claim 25). Vaeth, in col 4, lines 23-33, discloses that a gradient of reactivity is formed after pyrolysis in the CVD chamber prior to deposition such that two different

Art Unit: 1756

types of chemical groups (reactive monomer, and an intermediate monomer) have sufficient reactivity to react with carrier gas prior to deposition (claims 26-27). Vaeth, in col 3, lines 59-65, and in col 4, lines 23-45, discloses that the polymeric coating comprises at least one polymer that have sufficient reactivity and at least one polymer that has lesser affinity to reactivity (claim 28). Vaeth, in col 2, lines 1-29, discloses that the coating includes functional groups (precursors) that enhances surface properties (claim 32).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 4, 9, and 29-30, are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 5,869,135 (Vaeth et al) in view of U. S. Patent No. 6,291,072 (Kimoto et al).

Vaeth is discussed in paragraph no. 4.

The difference between the claims and Vaeth is that Vaeth does not disclose that [2,2] paracyclophanes are polymerized during the chemical vapor deposition process (claim 4). Vaeth does not disclose that [2,2] paracyclophane is deposited by i) purifying the [2,2] paracyclophane, ii) sublimating the [2,2] paracyclophane under a reduced pressure of less than 100 Pa, iii) heating the sublimated material to approximately

Art Unit: 1756

550°C - 900°C to cleave the C-C bonds to form the monomers, and iv) polymerizing the monomers that are absorbed on the substrate at a temperature below 150°C to produce a topologically uniform polymer film (claim 9). Vaeth does not disclose that the polymer with insufficient intrinsic reactivity to react with target molecules is a functionalized poly (p-xylylene) (claims 29-30)

Kimoto, in col 3, lines 26-67, in col 4, lines 1-2, in col 6, lines 66-67, and in col 7, lines 1-45, discloses that the [2,2] paracyclophane is polymerized in a LPCVD chamber by a) purifying [2,2] paracyclophanes (by separation method), b) sublimating the [2,2] paracyclophane in an evaporation chamber subjected to a pressure of about 6 Pa, c) heating the sublimated material in a decomposition chamber at a temperature of about 750°C to produce monomers, and d) polymerizing the coating formed on the sample placed on the susceptor at a temperature of about 60°C resulting in a dense insulating film. Kimoto, in col 2, lines 64-67, and in col 3, lines 1-49, discloses that the polymeric interface formed on the substrate is a functionalized poly-xylylene with that has insufficient intrinsic reactivity towards the target molecules (carrier gas in the chamber).

Therefore, it would be obvious to modify Vaeth by using [2,2] paracyclophane as the starting material in the CVD chamber to form a uniform film (non-reactive poly xylylene) of the sublimated and polymerized monomers as taught by Kimoto because Vaeth, in col 4, lines 1-46, teaches the sublimation, heating and decomposition of polymeric material to form monomers that are subsequently deposited by a CVD process on a substrate and later polymerized, and Kimoto, in col 4, lines 15-36,

Art Unit: 1756

discloses that employing such a method results in a film with excellent gap fill properties, lesser water adsorption, and a strong adhesion to metallic conductive layer.

Allowable Subject Matter

7. Claims 5, 8, 10-12, 15-20, 22-23, and 31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. Claim 2 is allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daborah Chacko-Davis whose telephone number is (703) 306-5923. If the examiner is unavailable, you may contact her supervisor, Mark F. Huff at (703) 308-2464. FAX communications should be sent to the appropriate FAX number; (703) 872-9311 for After Final Responses only or (703) 872-9310 for all other responses. FAXES received after 4:00 P.M. will not be processed until the following business day.

dcd 

June 11, 2003.



MARK F. HUFF
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